106208

APPENDIX C

SAMPLING PLAN

Sampling Plan

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1. Statement of Sampling Objective

The objectives of the sampling effort are a) the characterization of day-to-day Tunnel discharge quality, b) generally defining Susquehanna River water and sediment organic constituent concentrations and characterizing the River's benthic macroinvertebrate community in the vicinity of the Tunnel Discharge, c) the identification of possible accumulations of contaminants in the abandoned underground workings, and d) confirmation of the migration of low levels of contaminants throughout the workings. The specific tasks required to fulfill these objectives are to a) characterize the Tunnel discharge, b) sample the Susquehanna River water and sediment, and c) sample certain of the exploratory boreholes.

2. Background

The Tunnel was constructed prior to 1930 to drain surface water entering the mine workings of the Butler Colliery. Since the local area is not served by a public sewer system, area residents and businesses over the years have constructed boreholes for use in disposing liquid wastes. One such borehole (HWAS borehole) was used to dispose of waste oil and industrial wastewaters. The EPA and DER have concluded that these wastes could enter the Tunnel and discharge to the Susquehanna River.

The Tunnel discharge rate can apparently vary between approximately 2 and 12 mgd. At high Susquehanna River levels, the Tunnel outlet can be partially or even totally submerged.

Tunnel flow would be sampled over a one-year period in an attempt to characterize quality at various discharge rates. Two other mine drainage discharges, the Duryea Outfall and Buttonwood Outflow, will be sampled during one period each of relatively high and low discharge rates to establish Tunnel background conditions. During each period, one sample will be collected and analyzed for oil and the hazardous substances list (HSL) constituents.

Samples will be collected on a bi-weekly basis at the Tunnel entry. When the Tunnel entry becomes inaccessible due to ice or high River flow conditions, the samples will be collected through the 30-inch borehole. During one period each of relatively high and low Tunnel discharge rate, the sample will be analyzed for the HSL constituents. Subject to the results of the HSL analysis, the subsequent samples would be analyzed for oil and the 17 constituents identified in the consent order.

During one of the low-flow sampling periods, a Tunnel discharge sample will also be collected through the 30-inch borehole and analyzed for volatile organic compounds. This will allow the comparison of VOC concentrations above and below the Tunnel flow measurement device (a rectangular weir).

The same one-year period is proposed for the sampling of borehole liquids. Samples will be collected on a bi-weekly basis from the three proposed boreholes and certain of the existing boreholes. The first aqueous sample collected at each borehole will be analyzed for the HSL constituents. Subject to adjustment pending assessment of the HSL analyses, all other samples would be analyzed for oil and the 17 constituents identified in the consent order. The boreholes to be sampled are identified in Table 3-1 of the Work Plan. If possible, borehole sediment samples will be collected and analyzed for contamination. The existing boreholes will be inspected with a television camera to determine their condition. Based on the inspections and a discussion of the borehole conditions with the EPA, it will be determined if sampling borehole sediments can realistically be done and if so, how to best perform the sampling. In the case of the new exploratory boreholes, appropriate sample cuttings will be collected during the drilling of the boreholes and may be analyzed, based on discussion with EPA as to the extent of analysis required.

The Susquehanna River would be sampled during a relatively high flow period and a relatively low flow period. The River sampling will occur at three transects located at accessible sites approximately 2,000 feet upstream, 100 feet downstream, and 2,000 feet downstream of the Tunnel discharge. These locations of the transects are tentative. Exact locations of the transects will be determined upon field observations of the site and the

locations of combined sewer overflow discharge points. There will be three stations per transect - one near the shore, one at 250 feet from the eastern shore and one 500 feet from the shore. At each of the three stations in the transect, a surface water sample and depth-integrated sample will be collected. The surface sample would be analyzed for oil, and the composite sample would be analyzed for the HSL constituents.

During the low-flow period utilized for River water sampling, a near-shore River sediment sample will be collected at each of the transects. Penetration depth will be limited to a few centimeters. The samples will be analyzed for oil and the HSL constituents and to normalize the sediment data, pH, oxidation-reduction potential, grain size analysis, percent moisture and total organic carbon.

An evaluation of the benthic macroinvertebrate community of the Susquehanna River in the tunnel vicinity and a measurement of general water chemistry data including dissolved oxygen, pH, conductivity and temperature of the River will be performed by RMC Environmental Services of Pottstown, Pennsylvania.

Sample stations will be selected by biologists during a preliminary site visit based upon various criteria, including habitat variety, access, river flow, and site location in relation to the source of potential impact.

The sampling stations for the River sediment, River water and macroinvertebrate sampling will be located on the River transects in very close proximity. The exact location of the transects will be determined based on field observations. Macroinvertebrate sampling will be done prior to and in a slightly different location from the sediment chemical sampling to avoid sampling a disturbed environment.

The station located upstream of the Tunnel discharge will provide a control station for background information about the Susquehanna River aquatic communities in a location isolated from potential impact of the Tunnel. The station located directly below the Tunnel discharge will be in the area most susceptible to impact by the Tunnel. The downstream station will be sampled

to assess recovery from any stress that may be affecting the River communities. Potential impact will be determined by comparison of the macroinvertebrates obtained from the stations within the area of influence with the control station located outside the area of influence in terms of macroinvertebrate community structure and function.

Benthic macroinvertebrates will be sampled quantitatively using six replicated PIBS (Portable Invertebrate Box Sampler) samples taken in shallow, flowing water near shore. A qualitative kick sample also will be collected to determine to a greater extent the structure of the macroinvertebrate community. Previously established RMC QA/QC procedures will be observed for all phases of sampling, sorting, identification and equipment calibration.

Samples will be preserved in 70% isopropanol and transported to RMC's Macroinvertebrate Laboratory in Pottstown for sorting and identification.

The results of the biological and physical evaluation will be investigated using a variety of statistical methods including diversity and biotic indices, similarity and community loss coefficients, and taxa richness.

3. Equipment Specifications

Sample containers and types will be selected on the basis of the parameter being measured. A listing of standard sampling requirements is presented in Table 1; only those applicable to this project will be utilized. The equipment needs are summarized as follows:

Sampling bottles
Sample preservation kit - acids, bases, droppers
pH meter with temperature measurement
Decontamination equipment and required chemicals
Containers for sample transport

Sampling requirements will be reviewed with the U.S. Testing Company, Inc., the laboratory selected to perform the analyses.

Table 1

Standard Sampling Requirements

Parameter	Container	Vol. Req'd.	Preservative	Maximum Holding Time
General Tests:				
Acidity	P, G	100 ml	Cool, 4° C	14 days
Alkalinity	P, G	100 ml	Cool, 4° C	14 days
Dissolved Solids	P, G	100 ml	Cool, 4° C	7 days
BOD	P, G	1 L	Cool, 4° C	48 hours
pH	P, G	25 ml	None	Analyze immediately
Chlorine	P, G	200 ml	None	Analyze immediately
CN[1]	P, G	500 ml	Cool, 4° C NaOH to pH >12	14 days
TOC	G, teflon-lined cap	50 ml	Cool, 4° C HCL to pH <2	28 days
COD	P, G	50 ml	Cool, 4° C H_2SO_4 to pH <2	28 days
Oil and grease	G	1 L	Cool, 4° C H_2SO_4 to pH <2	28 days
Metals:[2]				
Chromium VI	P, G	100 ml	Cool, 4° C	24 hours
Mercury[3]	P, G	200 ml	HNO_3 to pH <2	28 days
Metals[3] (except above)	P, G	200 ml	HNO_3 to pH <2	6 months

Table 1 (continued)
Standard Sampling Requirements

Parameter	Container	Vol. Req'd.	Preservative	Maximum Holding Time
Organics:				
Phenols	G only	500 ml	Cool, 4° C H_2SO_4 to pH <2	28 days
Purgeable[4] Halocarbons	G, teflon-lined cap	40 ml (2 samples 80 ml total)	Cool, 4° C	14 days
Purgeable[4] Aromatics	G, teflon-lined cap	40 ml (2 samples 80 ml total	Cool, 4° C HCl to pH <2	14 days; 7 days without pH adjustment
Extractables[5]	G, teflon-lined cap	1 L	Cool, 4° C	7 days until extraction; 40 days after
Acrolein and Acrylonitrile	G, teflon-lined septum	40 ml (2 samples 80 ml total)	Cool, 4° C pH to 4-5	14 days

P - Plastic
G - Glass

Table 1 Notes

1. Store in closed, dark bottle. Maximum holding time of 24 hours if sulfide is present.

2. Total concentration.

3. Rinse sample container with 1:1 mixture by volume of HNO_3 and deionized water before use. Acidify the sample to pH <2 with 1:1 mixture.

4. The water sample is to be collected in two (2) 40 ml vials with teflon-faced silicone septa and screw caps, and maintained at 4°C.

   If aromatic compounds such as benzene, toluene and ethylbenzene are to be determined; one of the following procedures should be used to minimize degradation of these compounds by microbial action.

Collect about 500 ml of sample in a clean container. Adjust the pH of the sample to about 2 by addition of 1:1 HCl. Cap the container and invert once to mix; check the pH. Transfer the sample to a 40 ml vial. Invert the vial to check for air bubbles. If air bubbles are present, discard the sample and fill another vial.

Alternatively, the addition of $HgCl_2$ to the sampling vial (approximately 12 mg per 40 ml vial) has been found effective for inhibiting microbial action.

The following procedures apply to sampling directly with the sample vial:

a. Collect a single undisturbed sample of water for the analysis of volatile organics. Submerge the sample vial just below the surface upside down and slowly invert. Accomplish this task creating as little disturbance as possible.

b. Allow the vial to fill and reach equilibrium with its surrounding reservoir for several seconds.

c. Place the cap over the mouth of the vial so that the septum is properly oriented and screw down the cap firmly.

d. Invert the vial to discover any entrapped air bubbles. If such is the case, the sample will be discarded and another 40 ml vial selected and filled.

e. Collect a replicate sample per instructions above.

Label the sample vials with the appropriate designated sample tag.

Place the properly labeled sample vials in an appropriate carrying container maintained at 4°C throughout the sampling and transportation period.

Analyze sample within 14 days.

5. Grab samples must be collected in glass containers. Conventional sampling practices should be followed, except that the bottle must not be pre-rinsed with sample before collection.

Special provisions will be needed for the sampling of the boreholes and the Susquehanna River. The equipment needed for sampling liquids found in the boreholes includes: a pump for purging the boreholes, a tank for collecting the water removed, decontamination equipment and several bailers of the correct diameters (the boreholes range from 4" to 6" in diameter). Liquid samples will be removed from the boreholes using a pump or bailer. Borehole sediments will be removed if possible, using sample spoons and conventional drilling tools. The choice of removal method will be made upon evaluation of the condition of the individual boreholes. For River water sampling, composite samplers will be needed.

The typical equipment requirements for one sediment sampling station for chemical analysis includes:

Number	Size	Type	Analysis
2	4 oz.	Glass	VOC
1	8 oz.	Glass	Extractable Organics
1	4 oz.	Glass	TOC
1	4 oz.	Glass	pH
1	8 oz.	Glass	Metals & CN/Oil & Grease
1	32 oz.	Glass	Sieve

Additional sample bottles will be required for the field blanks and duplicate samples.

River sediment and macroinvertebrate sampling equipment cannot be chosen until an evaluation of the actual site conditions has been done. Typical sampling equipment used for the sediment chemical sampling purposes is described in Attachment A.

The EPA guidance documents describe a recommended procedure for the sampling of groundwater. The procedure would call for the purging or partial purging of each exploratory borehole and then allowing the borehole to recharge prior to sampling. Available information indicates that the recharge rate could be so slow in certain of the boreholes as to require an inordinate amount of time for sampling. The unique conditions of the boreholes will require that each borehole be evaluated individually and sampling procedures followed that obtain the most representative sample possible in light of actual field conditions.

Further information on equipment needs for borehole sampling can be found in Attachment B. Section 8 describes River sampling and associated equipment needs.

The Tunnel discharge flow rate will be measured using a weir and water level recorder. Current meter velocity measurements and a direction meter will be used when the weir is partially surcharged or when the River completely surcharges the weir and possibly the Tunnel entry. The specific equipment models of measuring devices are to be selected. The selection will be based on suitability, availability and price, and will take any special considerations into account.

4. Analytes of Interest

Liquid samples collected from various locations will be analyzed for either the HSL constituents and oil or the 17 consent order constituents and oil. This choice will be made upon assessing the results of the HSL analysis.

The River sediment samples will be analyzed for oil, the HSL constituents, pH, oxidation-reduction potential, grain size, percent moisture and total organic carbon. River samples will also be collected for benthic macroinvertebrate analysis.

5. Sample Types

Water samples will be taken at the Tunnel discharge, at Buttonwood Outflow and Duryea Outfall and from the Susquehanna River. Liquid samples will also be removed from the exploratory boreholes.

Grab samples will be taken for the Tunnel discharge and the boreholes. At each of three River sampling stations on each transect, a surface grab sample and depth-integrated grab sample will be taken.

Sediment samples will be collected from near-shore locations on each of the three River transects and if possible, from the exploratory boreholes. Benthic macroinvertebrate sampling will be done at a near-shore location for each of the transects.

All samples will be collected manually. Water level measurements will be recorded continuously for the one-year period for the Tunnel discharge and the exploratory boreholes.

6. Sample Locations and Frequency

Sampling will be performed for the Tunnel discharge, Buttonwood Outflow and Duryea Outfall, the exploratory boreholes, and the Susquehanna River. Bi-weekly samples of the Tunnel discharge and the exploratory boreholes will be taken for the period of one year.

Tunnel discharge samples will be removed from the mouth of the Tunnel or from the 30-inch borehole above the Tunnel when the Tunnel mouth is inaccessible.

The locations of the exploratory boreholes can be determined from Figure 3-1 in the Phase II Remedial Investigation Work Plan, and the boreholes from which samples will be collected are identified in Table 3-1 of the Work Plan. A summary of the sample locations and frequency is presented in the following:

Location	Method	Frequency	Analysis
Tunnel Discharge	Weir/Velocity Meter	Continuous, 1 year period	-
	Grab	Bi-weekly, 1 year period	Oil, HSL Constituents* Oil, Consent Order Contaminants
	Grab	One low flow period	Volatile Organics
Duryea Outfall & Buttonwood Outflow	Grab	One high flow period	Oil, HSL Constituents
		One low flow period	Oil, HSL Constituents

Location	Method	Frequency	Analysis
Boreholes Liquid	Water level recorder	Continuous, 1 year period	-
	Grab	Bi-weekly, 1 year period	Oil, HSL Constituents* Oil, Consent Order Contaminants
Boreholes Sediment	Grab	One Time Occurrence	Oil, HSL Constituents
River Liquid	Composite	One high flow period	HSL Constituents
		One low flow period	HSL Constituents
	Grab (Surface Only)	One high flow period	Oil
		One low flow period	Oil
River Sediment	Grab	One low flow period	Oil, HSL Constituents
	Grab	One low flow period	Benthic Macroin-vertebrate

* Initial samples will be analyzed for oil and the HSL constituents; subject to adjustment pending assessment of the HSL analyses, subsequent samples will be analyzed for oil and the 17 consent order constituents.

7. QA/QC

Quality assurance and quality control measures for water sampling are used to ensure the reliability of the subsequent laboratory work. The QA/QC plan includes sampling protocols and chain of custody procedures. The guidelines found in "Handbook for Sampling and Sample Preservation of Water and Waste Water" (EPA-600/4-82-029, September 82) will be followed to obtain representative samples.

Field blanks and duplicate samples are part of the QA/QC plan. Field blanks are used to insure that the sampling procedure was followed correctly and samples are not contaminated by the sampler. Duplicate samples are used to test the consistency of the laboratory analysis.

Field blanks consist of samples of deionized/distilled (DI/D) water handled and analyzed in the same manner as the water samples. Field blanks are collected at the same time as the other samples in a particular sampling event by running DI/D water through or over a decontaminated sample collection device and into an appropriate sample bottle. The volume of the blank samples should be the same as the corresponding samples. The sample bottles containing the field blanks are then shipped with the corresponding samples for analysis, receiving the same preservation, shipping and handling methods as the other samples. The field blanks should be designated and labelled as samples, to eliminate possible bias in the laboratory analysis. When analyzed, the field blanks can be used to identify possible sources of contamination due to the sampling methodology. Therefore, it is important that the field blanks be processed with the same protocol that the entire shipment receives, from the time of sampling until analysis.

Duplicate samples are essentially identical samples which are collected at the same time from the same waste stream, using the same methods, and contained, preserved and transported in an identical manner. When analyzed, the duplicate samples are used to verify the reproducibility and precision of the complete sampling and analysis methodology. Five percent of the samples submitted to the laboratory will be analyzed in duplicate.

One field blank and one duplicate sample will be analyzed per lot of samples or per 20 samples, whichever is more frequent.

Sample Control

The following sample identification and chain-of-custody procedures have been established.

Data collected from in-situ measurements will be recorded directly in field log books with identifying information (station identification, station location, date, time and samples), field observations and remarks.

Samples will be identified by a sample tag. Each sample container will be securely tagged and specifically identified with the following parameters:

Project Identification	-	Name specifically identifying the project
Station Identification	-	Name specifically identifying the station
Type of Sample	-	Grab or composite
Analyses Required	-	Enter parameters
Date	-	Six-digit number indicating the month, day and year of collection
Time	-	A four-digit number indicating the 24-hour time of collection
Samplers	-	Each sampler signs the tag
Preservatives	-	Yes or No, if yes describe preservative
Remarks	-	Sampler records pertinent information
Lab Sample Number	-	Will be completed by the receiving laboratory

After collection, identification and preservation, the sample will be maintained under chain-of-custody procedures.

Chain-of-Custody Procedures

Chain-of-custody procedures will be followed to maintain and document sample possession from the time the sample was collected until the derived data has been obtained, or for as long as samples will be stored.

Field Custody Procedures

1. As few people as possible will handle samples.

2. The individual collecting samples will be personally responsible for the care and custody of the samples collected until they are properly transported.

3. Sample tags will be completed and attached to each sample container. Sample tags will be completed using waterproof ink unless prohibited by weather conditions. Any deviations from above procedures will be explained with a logbook notation.

Transfer of Custody

1. Samples will be accompanied by a Chain-of-Custody Record. The individual relinquishing and receiving possession of samples will sign, date and note the time on the Record.

2. The Chain-of-Custody Record will contain the following information about the samples:
   Project Name
   Project Number
   Name of Container Supplier
   Method of Sample Shipment
   Sheet Number
   Sampler(s) Signature
   Sample ID
   Sampling Location

Transfer of Custody (Continued)

Date
Time
Sample Type
Sampling Method
Number of Containers
Container Type
Receiving Laboratory
Analysis Requested
Remarks

3. The original record will accompany the shipment, and a copy will be maintained by the Project Manager.

Field Monitoring Equipment - Quality Assurance

The manufacturer's recommended procedures for calibration and maintenance will be followed.

8. Susquehanna River Sampling

The River will be sampled during a period of low flow and high flow. It may become difficult to sample the River at very high flow rates, so sampling may have to be delayed until the River reaches a more moderate flow rate.

The Susquehanna River is approximately 1,000 feet across in the Tunnel discharge area. Three River transects will be chosen for sampling. These transects will be located at accessible sites approximately 2,000 feet upstream, 100 feet downstream, and 2,000 feet downstream of the Tunnel discharge. There will be three sampling points per transect - one near-shore, one at 250 feet from the eastern shore and one 500 feet from the shore. At each sampling point, a surface water sample and a depth-integrated sample will be collected.

A surface sample will be taken to measure any floating oil and grease that may be present. Surface samples and samples from shallow depths can be collected by simply submerging the sample container. This method is advantageous when collecting samples for oil and grease analysis since transfer of the sample may cause lower analytical results.

Depth-integrated composite samples will be taken using a Wheaton Grab Sampler, small peristaltic pump or Kemmerer sampling bottle. These samplers will allow the user to collect discrete depth samples for compositing. A bailer could also be used if it is determined that this type of a composite sample is appropriate. A bailer can be used to collect a composite sample but should not be used to collect discrete depth samples. A description of a Wheaton Grab Sampler can be found in Attachment C, and the use of a bailer is explained in Attachment B.

A sediment sample will be collected at a near-shore location on each transect for chemical contamination analysis. A near-shore sediment sample will also be collected for benthic macroinvertebrate analysis. The sampling equipment and procedures for the sediment chemical sampling are described in Attachment A.

Detailed procedures for the use of the sampling devices for the water and chemical sediment sampling can be found in Characterization of Hazardous Waste Sites - A Methods Manual, Volume II, EPA-600/4-84-076, December 1984. Additional information on the selection of stream sampling locations can be found in the National Handbook of Recommended Methods for Water - Data Acquisition, U.S. Department of Interior, 1977.

ATTACHMENT A

SAMPLING BOTTOM SEDIMENTS WITH A PONAR GRAB

Discussion

The Ponar grab is a clamshell type scoop activated by a counter lever system. The shell is opened and latched in place and slowly lowered to the bottom. When tension is released on the lowering cable the latch releases and the lifting action of the cable on the lever system closes the clamshell (see illustration).

Uses

Ponars are capable of sampling most types of sediments from silts to granular materials. They are available in a "Petite" version with a 232 square centimeter sample area. Penetration depths will usually not exceed several centimeters. Grab samplers are not capable of collecting undisturbed samples. As a result, material in the first centimeter of sediment cannot be separated from that at lower depths. The sampling action of these devices causes agitation currents which may temporarily suspend some settled solids. This disturbance can be minimized by slowly lowering the sampler the last half meter and allowing a very slow contact with the bottom. It is advisable however, to only collect sediment samples after all overlying water samples have been obtained.

Procedures for Use

1. Clean the sampling equipment prior to use as follows:

   (a) Wash with non phosphate detergent
   (b) Rinse with tap water
   (c) Rinse with deionized water
   (d) Rinse with acetone
   (e) Rinse with pesticide-grade hexane
   (f) Allow equipment to air dry (approximately: 1 to 2 minutes)

2. Attach a precleaned Ponar to the necessary length of sample line. Solid braided 5 mm (3/16 inch) nylon line is usually of sufficient strength; however, 3.2 mm (1/8 inch) air craft cable has been selected in order to allow for extensive sampling operations.

3. Measure and mark the distance to bottom on the sample line. A secondary mark, 1 meter shallower, will indicate proximity so that lowering rate can be reduced, thus preventing unnecessary bottom disturbance.

4. Open sampler jaws until latched. From this point on, support sampler by its lift line or the sampler will be tripped and the jaws will close.

5. Tie free end of sample line to fixed support (winch mount) to prevent accidental loss of sampler.

6. Begin lowering the sampler by winch until the proximity mark is reached.

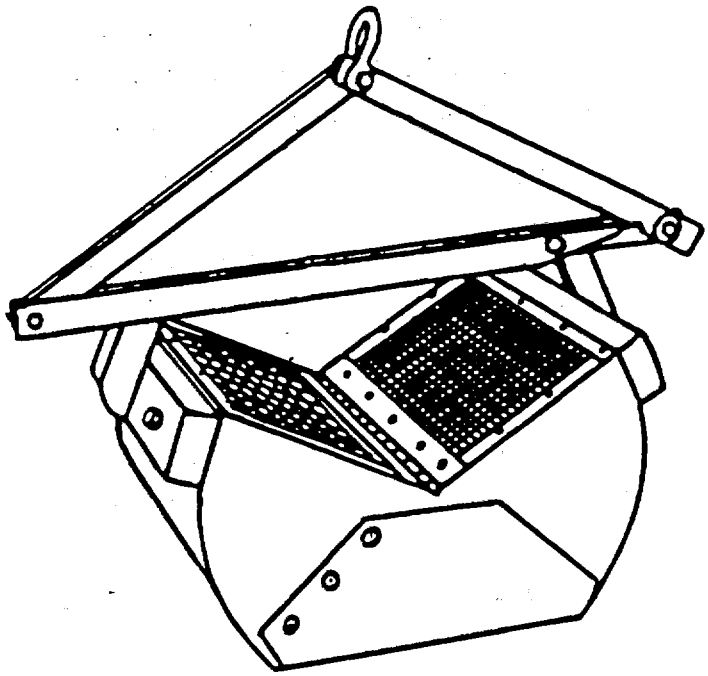
7. Slow rate of descent through last meter until contact is felt.

8. Allow sample line to slack several centimeters. In strong currents more slack may be necessary to release mechanism.

9. Slowly raise dredge clear of water surface.

10. Place Ponar into a stainless steel or Teflon tray and open. Lift Ponar clear of the tray.

11. Collect a suitable aliquot with a stainless steel lab spoon or equivalent and place sample into appropriate sample bottle.



PONAR GRAB

12. Check for a Teflon liner in cap if required and secure cap tightly. The chemical preservation of solids is generally not recommended. Refrigeration is usually the best approach supplemented by a minimal holding time.

13. Label the sample bottle with the appropriate sample tag. Be sure to label the tag carefully and clearly, addressing all the categories or parameters. Complete all chain-of-custody documents and record in the field logbook.

14. Listed in step number 1 above are appropriate decontamination procedures to be used on sampling equipment after use and between sampling locations.

Sources

U.S. Environmental Protection Agency, "Characterization of Hazardous Waste Sites - A Methods Manual: Volume II. Available Sampling Methods, Second Edition." EPA-600/4-84-076, December 1984.

ATTACHMENT B

SAMPLING MONITOR WELLS WITH A BUCKET TYPE BAILER

Discussion

Bucket type bailers are tall narrow buckets equipped with a check valve on the bottom. This valve allows water to enter from the bottom as the bailer is lowered, then prevents its release as the bailer is raised (see illustration). Top filling bailers are also available and may be useful for well purging but generally result in increased sample turbulence and are not recommended for sample acquisition.

Uses

This device is particularly useful when samples must be recovered from depths greater than the range (or capability) of suction lift pumps, when volatile stripping is of concern, or when well casing diameters are too narrow to accept submersible pumps. It is the method of choice for the collection of samples which are susceptible to volatile component stripping or degradation due to the aeration associated with most other recovery systems. Samples can be recovered with a minimum of aeration if care is taken to gradually lower the bailer until it contacts the water surface and is then allowed to sink as it fills. Teflon is generally the best construction material but other materials (PVC, stainless steel, etc.) are acceptable if compatible with designated sample analysis. The primary disadvantages of bailers are their limited sample volume and inability to collect discrete samples from a depth below the water surface.

Procedures for Use

1. Using clean, noncontaminating equipment, i.e., an electronic level indicator (avoid indicating paste), determine the water level in the well, then calculate the fluid volume in the casing.

2. Purge well.

3. Attach precleaned bailer to cable or line for lowering. A separate bailer should be dedicated to each well.

4. Lower bailer slowly until it contacts water surface.

5. Allow bailer to sink and fill with a minimum of surface disturbance.

6. Slowly raise bailer to surface. Do not allow bailer line to contact ground.

7. Tip bailer to allow slow discharge from top to flow gently down the side of the sample bottle with minimum entry turbulence.

8. Repeat steps 2-5 as needed to acquire sufficient volume.

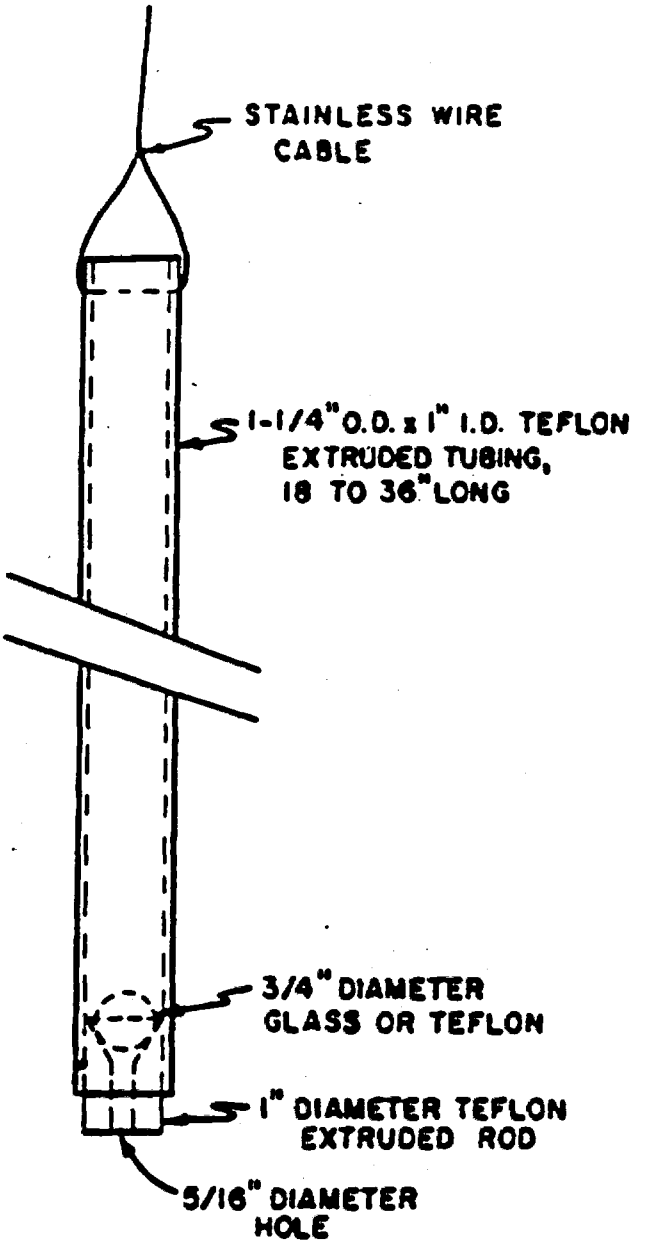
9. Select sample bottles and preserve the sample, if necessary, according to the guidelines in Table 1.

10. Check that a Teflon-liner is present in cap if required. Secure the cap tightly.

11. Label the sample bottle with an appropriate tag. Be sure to complete the tag with all necessary information. Record the information in the field logbook and complete all chain-of-custody documents.

12. Clean the sampling equipment prior to and between each use as follows:

    (a) Wash with non phosphate detergent
    (b) Rinse with tap water
    (c) Rinse with deionized water
    (d) Rinse with acetone
    (e) Rinse with pesticide-grade hexane
    (f) Allow equipment to air dry (approximately: 1 to 2 minutes)



TEFLON BAILER

Sources

U.S. Environmental Protection Agency, "Characterization of Hazardous Waste Sites - A Methods Manual: Volume II. Available Sampling Methods, Second Edition. EPA-600/4-84-076, December 1984.

Dunlap, W. J., McNabb, J. F., Scalf, M. R. and Crosby, R. L., "Sampling for Organic Chemicals and Microorganism in the Subsurface. EPA-600/2-77-176, August 1977.

ATTACHMENT C

COLLECTION OF WATER SAMPLES FROM
DEPTH WITH A WHEATON GRAB SAMPLER

Discussion

The Wheaton (990250) Grab Sampler is a water sampling device (see illustration) for collecting subsurface water samples without contamination from the surface of the water. A capped bottle is clamped to the lower end of the sampler and submerged in the water. A cap manipulating rod with a suction cup at the base is used to unscrew the cap from the bottle when the sample is collected.

Uses

The Wheaton sampler provides a practical means of collecting water samples below the surface to a depth of 1.83 meters (72 inches). Its major advantage over other samplers, such as a Kemmerer bottle, is that the sample can be collected directly into the actual sample bottle. It does not have to be transferred from one container to another. This eliminates the need for elaborate decontamination procedures.

Procedures for Use

1. Select appropriate size bottle clamp for sample bottle.
2. Attach sample bottle to sampler.
3. Attach the cap rod suction cup to bottle cap.
4. Lower sampler into surface water.
5. At sample depth turn cap rod counter clockwise to open bottle cap.
6. Lift cap rod 2 to 3 inches to collect water sample.
7. Lower cap rod and turn cap rod clockwise to close bottle cap.

8. Lift sampler from water and remove sample bottle from clamp.

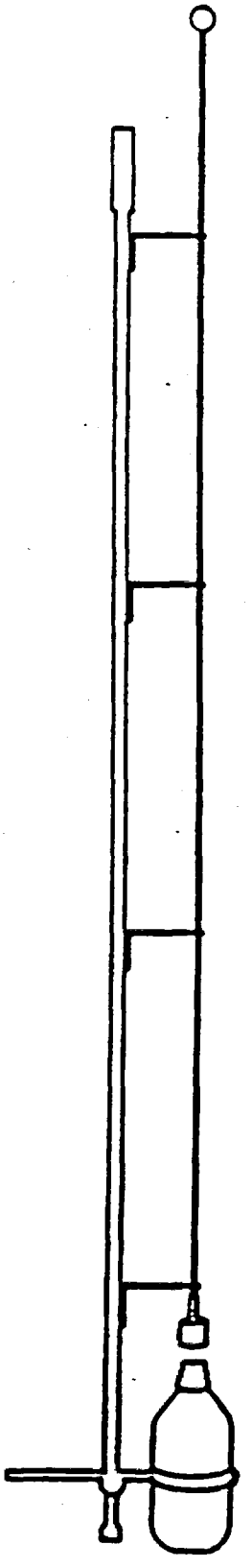
9. Secure cap tightly. Consult Table 1 for containerization and preservation recommendations.

10. Label the sample bottle with the appropriate sample tag. Be sure to label the tag carefully and clearly, addressing all the categories or parameters. Complete all chain-of-custody documents and record in the field logbook.

Sources

U.S. Environmental Protection Agency "Characterization of Hazardous Waste Sites - A Methods Manual: Volume II. Available Sampling Methods - Second Edition." EPA 600/4-84-076, December, 1984.

U.S. Environmental Protection Agency "Handbook for Monitoring Industrial Wastewater" Center for Environmental Research Information, Cincinnati, Ohio, August, 1973.



WHEATON GRAB SAMPLER

APPENDIX D

HEALTH AND SAFETY PLAN

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1. Introduction/Objectives

This Health and Safety Plan has been prepared as a part of the Butler Tunnel Site Phase II Remedial Investigation Work Plan. The Health and Safety Plan (hereinafter referred to as Safety Plan) has been developed to protect the health of Project and Authorized Personnel, and the surrounding community during remedial investigation activities.

This Safety Plan incorporates by reference the requirements of appropriate federal, state and local regulations and shall include but not be limited to the requirements of the Occupational Safety and Health Act (OSHA) 29 CFR 1910, 1915, 1917 and 1926, and the Commonwealth of Pennsylvania Worker and Community Right to Know Act, Act 1984-159.

The Consultant, PRPs, Contractors and government officials are responsible for insuring that all people in their employment while working at the Project Site, will comply with the requirements of this Safety Plan.

2. Definitions

For the purpose of this Safety Plan, the following definitions shall apply:

a. "Project Site" - Three hundred feet upstream on the Susquehanna River from the mouth of the Butler Tunnel; the mouth of the Butler Tunnel; the vicinity of existing boreholes No. 1, 2, 7, 10, 11, 12 and 13; and proposed boreholes 2-A, S-1 and 8-A. This area may be modified from time-to-time by the Project Manager.

b. "Project Personnel" - Project Personnel consist of all persons designated as Project Personnel by the PRPs, their Consultant, their Contractors or the EPA/State Coordinators, who are assigned at the Project Site.

c. "PRPs" - Potentially Responsible Parties as defined in the Consent Order.

d. "Consultant" - Gannett Fleming Environmental Engineers, Inc.

e. "Contractor" - Any person or firm retained by the PRPs or their Consultant to carry out and/or supervise any portion of the remedial investigation activities conducted at the Project Site.

f. "Authorized Personnel" - All individuals, other than Project Personnel, whose presence is authorized at the Project Site by the PRPs or the EPA/State.

g. "Health and Safety Officer" - Health and Safety Officer is an individual designated by the Consultant who:

1. Has a sound working knowledge of federal and state occupational safety and health regulations;

2. Has formal training or work experience in occupational safety and health;

3. Is responsible for site specific personnel training, field reevaluation and compliance with this Safety Plan;

4. With the approval of the Project Manager, has authority to order work to be suspended at the Project Site due to health or safety considerations and shall promptly inform the EPA/State of work suspended for such reason;

5. Will maintain a log book for recording all significant health and safety activities and incidents.

Health and Safety Officer may designate the Field Team Coordinator as his/her on-site representative.

3. Organization/Coordination

The following personnel are designated to carry out the stated job functions on site:

Project Manager	Mr. A. F. Miorin
Health and Safety Officer	Mrs. Robin Pepperman
Field Team Coordinator	Mr. Joseph Saliunas
Field Team Members	To be identified at the time of task implementation.
U.S.EPA Region III Rep.	Mr. Michael Towle
PA DER Representative	Mr. Reno Duccheski
Contractor(s)	To be identified at the time contractor(s) are retained.

All personnel arriving or departing the site should log in and out. All activities on-site must be cleared by the Field Team Coordinator.

4. On-Site Control/Air Monitoring

The Butler Tunnel Site is an unsecure site. No specific safe perimeter zones have been established, nor are such zones considered necessary.

A wooden fence will be erected during borehole drilling activities. Figure D-1 depicts a typical restricted drilling area. Equipment decontamination shall take place within the Exclusion Zone. With the approval of the Project Manager, the extent of the restricted area and its physical components may be modified.

The purpose of on-site monitoring is to identify and quantify airborne contaminants in order to determine the level of worker protection necessary. The following environmental monitoring instruments shall be used on-site at the specified frequencies:

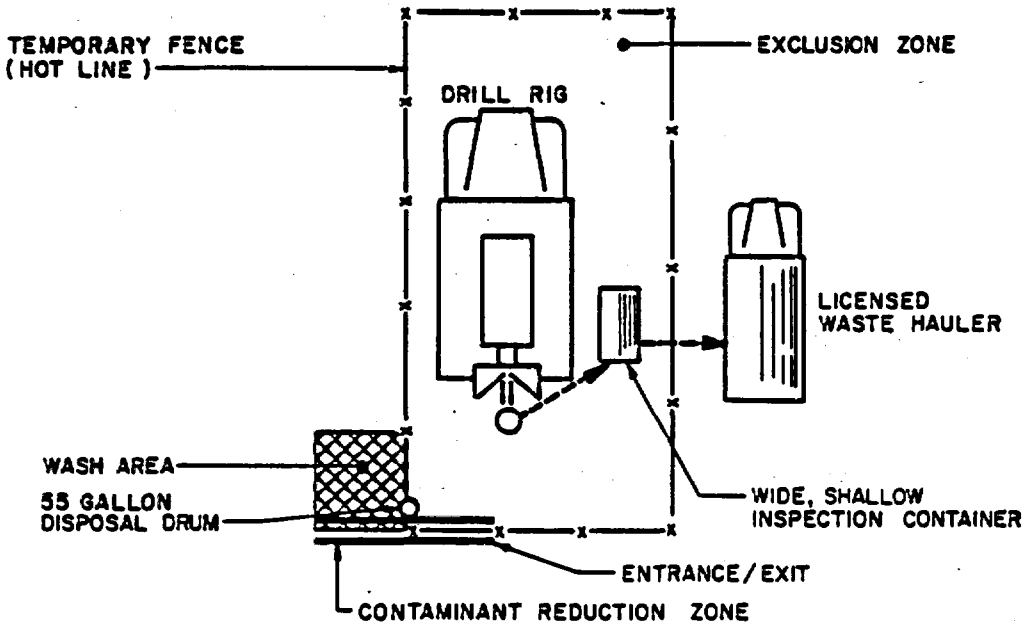
Combustible Gas Indicator/ O_2 Monitor	-	At least hourly during drilling activities; at least once during sample collection from each borehole.
HNU/OVA	-	At least hourly during drilling activities and continuously during drilling in obviously contaminated materials; at least once during sample collection at each borehole.
Colorimetric Tubes (Cyanide, assorted organics)	-	As needed during drilling activities.

5. Hazard Evaluation

The following substances have been identified in the Consent Order as present or suspected to be present on-site. Aqueous phase concentrations measured during the 1985 discharge incident are also presented.

Chemical Substance	Approximate Concentration in ppm
Benzene	0.03
Bis-(2EH) phthalate	2.10
4-Bromophenyl Phenyl Ether	D
Carbon Tetrachloride	0.03
Chloroform	0.02
Cyanide	4.70
Dichlorobenzene	1.4
Diethyl Phthalate	D
Dimethyl Phthalate	D
Di-n-Octyl Phthlate	0.11
Ethylbenzene	0.1
Methylene Chloride	0.80
Napthalene	D
Phenol	D
Toluene	0.05
Trichloroethylene	0.03
Xylene	D

D - Below detection limit.



NOTE : THE WASH AREA WILL BE EQUIPPED WITH :

- A PORTABLE EMERGENCY EYE WASH SHOWER UNIT
- A FIRST-AID KIT
- A FIRE EXTINGUISHER
- HAND WASH UNIT
- TOWELS / WIPE CLOTHS

BUTLER MINE TUNNELSITE

TYPICAL RESTRICTED ACCESS AREA OF PROJECT SITE

FIGURE D-1

During periods of high flow in the Susquehanna River, site access to the mouth of the Tunnel for sample collection may be impossible. During periods of such high flow, samples will be collected through the 30-inch borehole located near the mouth. This borehole accesses the interior of the Tunnel through the Tunnel roof.

Sampling of the Susquehanna River may also pose a potential danger. It is recommended that prior to sampling, the Pennsylvania Fish Commission, Sweet Valley Office be contacted. During high flow periods, ice flow and turbulent water may restrict access to the River. In addition to adherence to the requirements of Title 58 Pennsylvania Code, Chapter 97 of the Pennsylvania Fish Commission, it is recommended that Type 3 life vests be worn while sampling in the River. It is further recommended that during periods of high River flow an on-shore observer be stationed to visually monitor the safety of boat occupants.

6. Medical Monitoring

A medical examination of Project Personnel who may be coming in contact with hazardous materials is recommended to assess and monitor health and fitness both prior to involvement and at the completion of project employment; to provide emergency and other treatment as needed; and to keep accurate records for future reference.

It is recommended that affected Project Personnel receive a baseline medical examination prior to commencement of work at the Butler Tunnel Site and at the completion of project employment.

Whenever a situation occurs at the site that may pose a significantly increased health risk to any such Person, the Health and Safety Officer may recommend that any such individual consult with a physician or physician group for examination and treatment in accordance with good medical practice.

Whenever a Project Person exhibits symptoms or signs of chemical exposure or heat stress, the Health and Safety Officer may recommend that any such individual consult with a physician or physician group for examination and treatment in accordance with good medical practice.

The Health and Safety Officer shall consult with its Occupational Physicians' Group in developing the specific requirements of the baseline physical examination and that given at the completion of project employment. These requirements will be reviewed with all Project and Authorized Personnel prior to authorizing entry onto the Site.

7. Personal Protective Equipment

Based on the evaluation of potential hazards, the following levels of personal protection have been designated for the applicable work task:

Job Function	Level of Protection
Drill Rig Operation or Observation and Logging	C
Borehole or Tunnel Surveying, Tunnel Equipment Maintenance	C
River Surface Sampling and Tunnel Mouth Sampling	D
All Other Designated Tasks	To be determined by Health & Safety Officer prior to the execution of Task.

Specific protective equipment for each level of protection is as follows:

Level C	Splash Gear (Chemical resistant TYVEK) Chemical Resistant Gloves Chemical Resistant Boots Hardhat Full Face Canister Respirator Hearing Protection

Level D	Coveralls Safety Boots or Shoes Safety Goggles Hardhat Gloves

The Health and Safety Officer shall make recommendations as to the proper level of personal protective equipment to be used by Project Personnel. It shall, however, be the responsibility of each Project Person to carry out these recommendations in a timely and appropriate manner.

The following criteria will be utilized by the Health and Safety Officer in recommending to the Project Manager the upgrading or downgrading of the level of protection:

1) Presence or absence of dermal hazards;
2) Change in gas or vapor concentrations;
3) Change in work task which would increase or decrease potential contact with hazardous materials;
4) New information indicating the site is more or less hazardous than was originally thought.

NO CHANGES TO THE SPECIFIED LEVELS OF PROTECTION SHALL BE MADE WITHOUT THE APPROVAL OF THE PROJECT MANAGER AND HEALTH AND SAFETY OFFICER.

Each Project Person shall inspect Personal Protective Equipment daily prior to use for tears, discolorations, cracks, punctures, stiffness or other malfunctions. Defective equipment shall not be used and shall be reported to the Health and Safety Officer.

Clothing and respirators should be clean and stored in plastic bags in a designated area free from exposure to dust, moisture, sunlight, damaging chemicals, extreme temperature and impact.

Respirator chemical cartridges should be replaced in accordance with the manufacturer's recommendation.

Occupational Safety and Health Administration (OSHA) requires in 29 CFR Part 1910 Subparts 1 and 2, instruction in the proper use, maintenance, and application of respirators and fit-testing of respirators.

8. On-site Work Plan

Specific work parties for tasks designated in this Work Plan have not yet been formulated. The contents of this plan will be reviewed with each work party as it is organized.

9. Communication Procedures

All Project or Authorized Personnel wishing to enter the Project Site shall notify the Field Team Leader prior to entry. Logging one's presence in and out of the Project Site is required.

Neither radio nor horn communication is expected to be utilized as part of the remedial investigation activities due to the short duration of field assignments.

10. Emergency Procedures

The following standard emergency procedures will be used by on-site personnel. The Health and Safety Officer shall be notified of any on-site emergencies and be responsible for ensuring that the appropriate procedures are followed:

1) Personnel Injury in the Exclusion Zone: Upon notification of an injury in the Exclusion Zone, the Field Team Leader and Health and Safety Officer will assess the nature of the injury. If the cause of the injury or loss of the injured person does not affect the performance of site personnel, operations may continue, with the on-site Emergency Medical Technician (EMT) initiating the appropriate first aid and necessary follow-up as stated above. If the injury increases the risk to others,

all site personnel shall move to the hot line for further instructions. Activities on-site will stop until the added risk is removed or minimized.

2) Fire/Explosion: In the event of a fire or explosion on-site, a verbal emergency signal will be given and all affected personnel shall assemble at the hot line. The fire department shall be notified by the Emergency Phone No. 717-624-2424 and all personnel moved to a safe distance from the involved area.

3) Personal Protective Equipment Failure: If any site worker experiences a failure or alteration of protective equipment that affects the protection factor, that person shall immediately leave the Exclusion Zone. Re-entry shall not be permitted until the equipment has been repaired or replaced.

4) Other Equipment Failure: If any other equipment on-site fails to operate properly, the Field Team Leader and Health and Safety Officer shall be notified and then determine the effect of this failure on continuing operations on-site. If the failure affects the safety of personnel or prevents completion of the Work Plan tasks, all personnel shall leave the Exclusion Zone until the situation is evaluated and appropriate actions taken.

In all situations, when an on-site emergency results in evacuation of the Exclusion Zone, personnel shall not re-enter until:

a) The conditions resulting in the emergency have been corrected.

b) The hazards have been reassessed.

c) The Safety Plan has been reviewed.

d) Project Personnel have been briefed on any changes in the Safety Plan.

List of Emergency Telephone Numbers

Police:	
Pittson City	717-654-2424
Fire:	717-654-2424
Ambulance:	717-654-2525
Hospital:	
Wilkes-Barre General Hospital	717-829-8111
US EPA National Response Center	800-424-8802
US EPA Region III - Mr. Michael Towle	215-597-9800
PA DER - Mr. Reno Duccheski	717-826-2516
Fish Commission-Sweet Valley	717-477-5717
GFEE - Mr. A. F. Miorin	737-763-7211
PRP Project Coordinator - Mr. A.B.M. Houston	313-594-0324

11. Decontamination

Efforts shall be made by all Project and Authorized Personnel to minimize contact with contaminated soils and/or liquids.

During remedial investigation activities requiring the use of Level C or Level D personal protective equipment, Figure D-2 shall be consulted in setting up decontamination stations. All contaminated disposable clothing shall be disposed of in plastic bags for subsequent decontamination and/or disposal.

12. Confined Space Entry

Entry into the 30-inch borehole or Tunnel constitute entry into confined space. In addition, other confined spaces may be encountered at the Project Site. Accordingly, all activities performed in confined spaces shall be carried out in accordance with OSHA requirements and as set forth herein.

Definitions

a. "Confined Space" - A space that by design has extremely limited provisions for entry and exit, has poor natural ventilation, and contains or may contain a hazardous atmosphere.

b. "Dangerous Air Contamination" - An atmosphere that is dangerous to life or health. Such an atmosphere is defined as containing:

   1. Flammable gases or vapors at concentrations in excess of 10% of their lower flammable limit.

   2. Combustible dust at concentrations greater than 10% of the minimum explosive concentration.

   3. Oxygen at concentrations less than 19.5% or greater than 25% by volume.

4. Toxic Chemicals in concentrations greater than listed in Subpart Z, 29 CFR 1910.

c. "Isolation" - A process whereby the confined space is removed from service and completely protected against the inadvertent release of material by physical means such as the following: installing a double block and bleed system, locking out all sources of electrical power, and blocking or disconnecting all mechanical linkages.

d. "Oxygen Deficiency" - An atmosphere containing oxygen at a concentration of less than 19.5% by volume.

e. "Qualified Person" - A person designated in writing by the Health and Safety Officer as capable of anticipating, recognizing and evaluating employee exposure to hazardous substances or other unsafe conditions in a confined space. A qualified person must be capable of specifying necessary control and/or protective action to ensure worker safety.

f. "Respirator (Approved)" - A device designed to protect the wearer from inhalation of harmful atmospheres that has been approved by the Bureau of Mines, the National Institute for Occupational Safety and Health, and the Mine Safety and Health Administration.

Hazards

a. Because most asphyxiants are colorless and odorless, atmospheres that are deficient in oxygen may not be readily apparent. Human responses to atmospheres deficient in oxygen are described in the table below.

Figure D-2

Decontamination Procedure

Station 1:	Equipment	Deposit equipment used on-site (tools, sampling devices and containers, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths. Segregation at the drop reduces the probability of cross contamination. During hot weather operations, a cool down station may be set up within this area.
Station 2:	Outer Garment, Boots and Gloves Wash and Rinse	Scrub outer boots, outer gloves and splash suit with decon solution or detergent water. Rinse off using copious amounts of water.
Station 3:	Outer Boot and Glove Removal	Remove outer boots and gloves. Deposit in container with plastic liner.
Station 4:	Canister or Mask Change	If worker leaves exclusion zone to change canister (or mask), this is the last step in the decontamination procedure. Worker's canister is exchanged, new outer gloves and boot covers donned, joints taped, and worker returns to duty.
Station 5:	Boot, Gloves Outer Garment Removal	Boots, chemical-resistant splash suit and inner gloves removed and deposited in separate containers lined with plastic.
Station 6:	Face Piece Removal	Facepiece is removed. Avoid touching face with fingers. Facepiece deposited on plastic sheet.
Station 7:	Field Wash	Hands and face are thoroughly washed. Shower as soon as possible.

Oxygen Volume %	Symptoms
12-16	Breathing and pulse rate increased, muscular coordination slightly disturbed.
10-12	Consciousness continues, emotional upsets, abnormal fatigue upon exertion, disturbed respiration.
6-10	Nausea and vomiting, inability to move freely, possible loss of consciousness, may collapse, and although aware of circumstances may be unable to move or cry out.
Below 6	Convulsive movements, gasping respiration, respiration stops, and a few minutes later heart stops.
0	Exposure to an atmosphere containing no oxygen will cause unconsciousness in seconds.

b. Because of odor or other effects on the senses, a toxic atmosphere may provide warning. However, such a warning is of little value if toxic gases or vapors exist in concentrations capable of quickly disabling a person.

c. Atmospheres that are flammable are also likely to be toxic. Contaminants must be evaluated with respect to both flammability and toxicity.

d. Frequently, the by-products of work procedures generate flammable, toxic or oxygen deficient conditions within a confined space.

Operating Procedures and Employee Training

a. Employees entering confined spaces must be informed of actual and potential hazards. CLEAR WRITTEN OPERATING AND RESCUE PROCEDURES MUST BE DEVELOPED FOR EACH WORK SITE AREA BY A QUALIFIED PERSON AND APPROVED BY THE SITE HEALTH AND SAFETY OFFICER. A COPY MUST BE PROVIDED FOR EACH AFFECTED EMPLOYEE.

b. Operating procedures must include provisions for the surveillance of the surrounding area to ensure that hazards from outside the confined space are not introduced into the confined space.

c. Employees, including standby persons, must be trained in operating and rescue procedures.

1. Employees must be trained in the use of appropriate approved respiratory equipment. The need for such respiratory equipment should be determined prior to the situation.

2. Employees must be trained in the correct use of safety belts, harnesses and lanyards.

3. At least one person trained in first aid and cardiopulmonary resuscitation (CPR) must be immediately available whenever the use of respiratory protective equipment is required.

4. When respiratory protective equipment is required or whenever employees inside a confined space are out of sight of the standby employees, an effective means of communication between the employees inside the confined space and the standby employees must be provided. This communication can be by voice or by electronic equipment. The type of communication system depends on the situation. Employees must be trained in the use and testing of such a communication system.

Entry Into Confined Spaces

The appropriate provisions of this paragraph must be implemented before employees are allowed into a confined space.

a. The space must be emptied, flushed, or otherwise purged of flammable, injurious, or incapacitating substances to the extent feasible.

b. The air must be tested with an appropriate instrument or other method to determine whether dangerous air contamination or oxygen deficiency exists, and a written record of the test results must be made and kept at the work site for the duration of the work. Affected employees must be afforded an opportunity to review the test results.

c. An approved safety belt with an attached line at least 1/2-inch in diameter and 2,000 pound test, with the free end of the line secured outside the entry opening, must be used - UNLESS, of course, the safety belt and attached line would further endanger the life of the employee.

d. At least one employee must stand by on the outside of the confined space ready to give assistance in case of emergency. At least one additional employee, who may have other duties, must be within sight or call of the standby employee at all times.

e. If there is no evidence of dangerous air contamination or oxygen deficiency within the space as demonstrated by tests required by Paragraph b above, entry into the work area within the space may proceed subject to the following provisions:

1. Testing, in accordance with Paragraph b above, must be conducted frequently enough to ensure that a safe atmosphere exists.

2. If the development of dangerous air contamination or oxygen deficiency is imminent, the requirements of Paragraph f below apply.

f. Additional ventilation may be used to meet the test levels required by Paragraph b above.

g. No source of ignition may be introduced until tests ensure that dangerous air contamination due to flammable or explosive substances does not exit.

h. When oxygen-consuming equipment, such as salamanders, torches, furnaces, etc., is employed, measures must be taken to ensure adequate combustion air and exhaust gas venting.

i. To the extent feasible, provisions must be made to maintain entry and exit routes.

Confined Space Entry Permit

Before work in a confined space begins, Confined Space Entry Permit, Figure D-3, must be completed by a qualified person and authorized by the Health and Safety Officer. Blank forms are available from the Health and Safety Officer. When properly filled out, the form describes the work to be done, names the employees who will do it and treats in detail the procedures and precautions to be employed to deal with the hazards.

Figure D-3

CONFINED SPACE ENTRY PERMIT

Expiration Date: _____

Location of Work: _____

Description of Work: _____

Previous Contents: _____

Entry and Standby Personnel (Name): _____

Expected Entry Date: _____ Expected Entry Time: _____

Outside Contractors (Name): _____

HAZARDS EXPECTED

- Corrosive Materials
- Hot Equipment
- Flammable Materials
- Toxic Materials
- Inert Gases
- Cleaning (Ex.: Chemical or Water Lance)
- Spark-Producing Operations
- Spilled Liquids
- Other

PERSONNEL PROTECTIVE EQUIPMENT

- Respirators
- Protective Clothing
- Protective Helmets
- Eye Protection
- Foot Protection
- Life Lines and Harness
- Lighting
- Communications Equipment
- Ventilation

Supervisor/Contractor: _____ Bldg./Phone: _____

Instrumentation Model/Type: _____

Calibration Date: _____ Calibrated By: _____

ATMOSPHERIC TESTS

Tests Performed:	Concentration	Recheck
Explosibility (% of LEL)	_____	_____
Oxygen	_____	_____
Toxic Materials	_____	_____
_____	_____	_____
_____	_____	_____

ISOLATION CHECKLIST

- Blanking and/or Disconnection
- Electrical
- Mechanical
- Tagging & Lockout
- Other

Tests Performed By: _____ Time: _____ Date: _____

Recheck Performed By: _____ Time: _____ Date: _____

TRAINING:

Have entry and standby employees received proper training? Yes No

Special Entry and/or Work Procedures _____

_____

Emergency Telephone Number: _____

Authorized By:

On-Site Supervisor: _____ Date: _____

Health & Safety Officer: _____ Date: _____

APPENDIX E

DATA MANAGEMENT PLAN

Introduction

This data management plan sets forth a) the documentation procedures to be followed during the course of field investigations requiring the collection of data, and b) the project filing system.

Documentation of Field Measurements and Observations

All field measurements and observations will be recorded in field data logs. The field data will include the results of measurements, and observations. All entries will be signed and dated. If an entry must be changed, the reason for the change will be stated and the original entry will not be obscured.

The responsibility for recording the field data associated with the varying types of field activities rests with the individual in charge of that field activity. The Quality Assurance Manager will have the responsibility for auditing this requirement.

Sample Identification and Chain-of-Custody

Information on sample identification and field-selected chain-of-custody procedures is included in Section 7 (QA/QC) of the Sampling Plan. The laboratory procedures for chain-of-custody are presented in the Quality Assurance Project Plan.

Document Control, Inventory and Filing System

A data storage and information system will be used to receive all data, screen and validate data for completeness, enter data into data storage files and enter QA/QC information with the associated data. The specific QA/QC information and procedures for screening and validating the data are described in the Quality Assurance Project Plan.

A filing system will be used to manage the project documents. Project documents will be maintained for three years after completion of all work. At that time Respondents and EPA will determine the disposition of such documents.

Each document will be numbered and the outline for the filing system will be that set forth in "Guidance on Remedial Investigation under CERCLA". The major file headings are as follows:

1. Congressional Inquiries/Hearings

2. Remedial Response

   - o Discovery
   - o Remedial Planning
   - o Remedial Implementation
   - o State and Other Agency Coordination
   - o Community Relations

3. Imagery

4. Enforcement

5. Contracts

6. Financial Transactions

The information and data made available by regulatory agencies for the Phase I RI had not been filed by the agencies in accordance with this outline. Said information and data will be retained by Respondents in the "as delivered" form; Phase II RI information and data generated by Respondents will be filed, to the extent applicable, in accordance with the outline.

FEASIBILITY STUDY

TASK 8 - DESCRIPTION OF CURRENT SITUATION

Information on site background, the nature and extent of the problem, and previous response activities presented in the RI reports may be incorporated by reference.

A site-specific statement of purpose for the response will be presented, based on the results of the remedial investigation and discussion with EPA. The statement of purpose will identify, to the extent applicable, actual or potential exposure pathways that should be addressed by remedial alternatives and the reduction in levels of exposure over time.

Respondents propose to undertake this task concurrently with the Phase II RI.

TASK 9 - PRELIMINARY REMEDIAL TECHNOLOGIES

Based on the site-specific problems and the statement of purpose identified in task 8, the potentially feasible technologies initially identified in task 5 will be updated. These technologies could include both on-site and to the extent applicable, off-site remedies. On-site technologies would include a contaminant detection/monitoring system at the Tunnel entry and the pumping of isolated contaminant volumes. The master list will be screened on the basis of site conditions, waste characteristics, technical requirements and conditions peculiar to the Butler Tunnel site. Those technologies that may prove extremely difficult to implement, will require unreasonable time periods to implement, or will rely on insufficiently developed technology will be eliminated or modified.

Respondents propose to undertake this task concurrently with the Phase II RI.

TASK 10 - DEVELOPMENT OF ALTERNATIVES

Based on the results of the remedial investigation, task 9 considerations, and the objectives established for the response a limited number of alternatives would be developed for source control and/or off-site remedial actions.

10.1 Establishment Of Remedial Response Objectives

Site-specific objectives for the response would be established. These objectives would be based on public health and environmental concerns, task 8 considerations, remedial investigation results, and federal and state requirements. Inherent in the establishment of objectives is the identification and listing of applicable, relevant and appropriate requirements. The exposure point at which the requirements will be applied is currently identified as the Tunnel discharge. Objectives for source control measures would be developed, to the extent applicable, to minimize migration of contamination from the site. To the extent applicable, objectives for off-site migration measures would be developed to minimize impacts of contamination that may have migrated from the site.

10.2 Identification Of Remedial Alternatives

Workable alternatives would be developed that incorporate task 9 remedial technologies, response objectives, and other appropriate considerations into a comprehensive site-specific approach. To the extent applicable, the following would be considered:

1) Alternatives for off-site treatment or disposal;

2) Alternatives which attain applicable and/or relevant Federal public health or environmental standards;

3) Alternatives which exceed applicable and/or relevant public health or environmental standards;

4) Alternatives which do not attain applicable and/or relevant public health or environmental standards but would reduce the likelihood of present or future threat from hazardous substances. These would include an alternative which closely approaches the level of protection provided by the applicable or relevant standards; and

5) No action.

Additional alternatives might also be developed in consultation with EPA and DER.

Respondents propose to undertake this task concurrently with the Phase II RI.

TASK 11 - INITIAL SCREENING OF ALTERNATIVES

The alternatives developed in task 10 would be screened to eliminate those that are clearly infeasible, inappropriate, insufficiently developed technologically so as to be unfeasible and/or which would require unreasonable time periods to implement.

11.1 Considerations To Be Used In Initial Screening

Three broad considerations would be used as the basis for the initial screening; namely cost, public health, and the environment. More specifically, the following factors would be considered:

Environmental Protection

Only those alternatives that satisfy the response objectives and contribute substantially to the protection of public health, welfare, or the environment would be considered further. Source control alternatives would address control of source materials. Management of migration alternatives would address the threat of harm to public health, welfare, or the environment.

Environmental Effects

Alternatives posing significant adverse environmental effects would be excluded.

Technical Feasibility

Technologies that may prove extremely difficult to implement, would not achieve the remedial objectives in a reasonable time period, or would rely upon unproven technology would be modified or eliminated.

Cost

An alternative whose cost far exceeds that of other alternatives would be eliminated unless other significant benefits might be realized. Total costs would include the cost of implementing the alternative, and the cost of operation and maintenance for the period of record.

Cost screening would be conducted after the environmental and public health screenings have been performed.

Because the problems associated with the Butler Tunnel site are unique, the Respondents would present the site-specific statement of purpose and the results of the initial screening process to EPA and DER for review, discussion and approval prior to proceeding with subsequent tasks. In addition, the Respondents acknowledge that a public meeting may be conducted by EPA and DER after the statement of purpose and the results of the screening process are agreed upon between the Respondents and these agencies.

Respondents propose to undertake this task concurrently with the Phase II RI.

TASK 12 - EVALUATION OF THE ALTERNATIVES

The cost-effectiveness, taking into account long-term operating and maintenance activities, of alternative remedies that pass through the initial screening would be evaluated.

12.1 Technical Analysis

To the extent applicable, the Technical Analysis would:

1) Describe appropriate treatment, containment, storage and disposal technologies including the existing state of each technology.

2) Discuss the extent to which the alternative complies with the requirements of environmental programs. If an alternative does not comply, Respondents will evaluate the extent to which it prevents or minimizes the potential for waste migration, the likelihood of it reducing waste migration, and public health and environmental impacts. The applicability of design modifications would also be discussed.

3) Outline operation, maintenance, and monitoring requirements.

4) Identify the extent to which off-site facilities might be utilized, and determine whether these facilities are in compliance with applicable EPA and DER environmental program requirements, both current and proposed. Potential disposal facilities would be evaluated to determine whether the off-site management of site wastes might create the potential for a future release from the disposal facility.

5) Identify temporary storage requirements, off-site disposal needs, and transportation plans.

6) Describe whether the alternative results in permanent treatment or destruction of the wastes; and, if not, the potential for future release to the environment and the possibility of reduction in levels of release over time.

7) Outline health and safety requirements for remedial implementation.

8) Assess the extent to which various operable units of the total remedy could be implemented individually or in groups, and the environmental and cost impacts of such phasing.

9) Assess the extent to which phased implementation could be considered.

10) Describe special engineering requirements or site preparation considerations.

12.2 Environmental Analysis

An Environmental Assessment (EA) would be conducted for each alternative based largely on results from the remedial investigation. The EA would focus on site problems and pathways of contamination. The EA for each alternative would include, to the extent applicable, an evaluation of a) beneficial effects of the response, b) adverse effects of the response, and c) an analysis of measures to mitigate adverse effects. The no-action alternative would be evaluated to describe the current site situation and anticipated environmental conditions if implemented.

12.3 Public Health Analysis

Each alternative would be assessed in terms of the extent to which it a) mitigates long-term exposure to any residual contamination, and b) protects public health both during and after implementation. The assessment would describe the levels of on-site contaminants, potential exposure routes, potentially affected populations and reduction in level of exposure over time.

For management of migration measures the relative reduction in impact would be determined by comparing residual levels of each alternative with pertinent criteria, standards, or guidelines defined as part of task 10. For

source control measures or when criteria, standards, or guidelines are not available the comparison would be based on the relative effectiveness of technologies.

12.4 Institutional Analysis

Each alternative would be evaluated on the basis of relevant institutional needs. Regulatory requirements, permit requirements, community relations, and participating agency coordination would be assessed.

12.5 Cost Analysis

The cost for each feasible remedial action alternative, including costs for each phase or segment, would be defined. The costs would be presented as present worth costs, and would include the cost of implementation and the annual operating and maintenance cost.

12.6 Evaluation of Cost-Effective Alternatives

Alternatives would be compared using technical, environmental, and economic criteria. To the extent applicable, the following would be used to compare alternatives:

Present Worth Costs

The net present value of capital, and operating and maintenance costs would be presented.

Health Information

Human exposure to representative Tunnel discharge compounds would be assessed. For each alternative, the potential for human exposure to Tunnel discharge compounds would be compared with a) pertinent criteria, standards or guidelines defined as part of task 10, or b) quantities that are acceptable or that correspond to pertinent levels of risk for each exposure route of concern.

Environmental Effects

The most important effects or impacts would be evaluated.

Technical Aspects of the Remedial Alternatives

The technical aspects of each remedial alternative relative to the others would be delineated.

Information on the Extent to Which Remedial Alternatives Meet the Technical Requirements and Environmental Standards of Applicable Environmental Regulations

The extent to which each alternative meets technical requirements and environmental standards would be identified.

Information on Community Effects

The extent to which implementation of a remedial alternative might disrupt the community would be assessed.

Other Factors

Considerations, other than those previously identified, that would have a bearing on implementation would be identified and assessed.

TASK 13 - PRELIMINARY REPORT

Upon completion of tasks 8, 9, 10 and 11 Respondents will prepare and submit to EPA for review and discussion a report setting forth findings and conclusions. This preliminary report, and the findings and conclusions set forth in the Phase II RI report would serve as the basis for establishing the scope of work and schedule for completion of the Feasibility Study.

TASK 14 - FINAL REPORT

Upon completion of the Feasibility Study, the final report in draft format will be prepared and submitted to EPA for review and subsequent discussion. Respondents acknowledge that EPA may solicit public comments to which Respondents would reply. Upon EPA approval of the draft report, Respondents would prepare the final Feasibility Study report.

TASK 15 - ADDITIONAL REQUIREMENTS

15.1 Budget

The Respondents will prepare individual task budgets prior to task implementation.

15.2 Personnel Requirements

Respondents have determined that personnel resources are available to perform work on the various tasks in accordance with the proposed schedule.

15.3 Schedule

The proposed Feasibility Study schedule for completion of tasks 8, 9, 10, 11 and 13 (Phase I FS) is presented in Appendix A. The scheduled undertaking of tasks 8, 9, 10 and 11 is such that submittal of the preliminary Feasibility Study report to EPA would be made concurrently with submittal of the Phase II RI report.

As noted in task 13, findings and conclusions set forth in the preliminary Feasibility Study and Phase II RI reports would serve as the basis for establishing the completion schedule.